For many years he remained at Cambridge. After vacating his Fellowship by marriage he resided for a short time at Grantchester, near Cambridge, whence he removed to Cheltenham, where the last thirty-two years of his life were spent.

For many years before his death, owing to ill health, he was unable to devote his time to work. He died 1887, March 31.

Mr. Gaskin was a Fellow of the Royal Society, having been elected 1839, March 21.

He was elected a Fellow of this Society 1836, November 11.

PETER GRAY was born in Aberdeen about the year 1807. His parents were not in affluent circumstances, but they were enabled to give their children a tolerably good education. Mr. Gray was educated at Gordon's Hospital, where he early developed signs of considerable mental power. His success there won for him the distinction of being one of the six pupils annually nominated by the Hospital to receive tuition at Marischal College. Here he devoted much of his energies to mathematics, but he also had a taste for mechanics, and while quite a young man he devoted himself to grinding lenses.

Mr. Gray appears to have begun business as a bookseller, but before leaving Aberdeen he was induced to take up the pursuit of wood engraving, which he assiduously pursued for a time, and in which he attained a certain proficiency; but all this time he had not settled down to any occupation or profession for life. His letters and papers in the *Mechanics' Magazine* on mathematical subjects, especially relating to actuarial science, made his name known; and in 1842, soon after his first contributions appeared, he came to London and accepted a position in the establishment of Messrs. Samuel Courtauld & Co.

About this time his mathematical talent developed itself, and led to his being taken in hand by the late Professor De Morgan, who showed much interest in his writings and gave him valuable assistance in many ways. While scrupulously attending to the duties of his office in the daytime, he had always leisure in the evening to devote to his mathematical researches. Actuarial science had always the chief fascination for him, and in 1849 he published an important volume of tables and formulæ for the computation of life contingencies, to which an addendum was subsequently published in 1870. The primary object of these tables is to afford the means of determining the logarithm of the sum and difference of two numbers whose logarithms are known, the numbers themselves being unknown. The problem is therefore given log. a and log. b, find log. $(a \pm b)$ by the taking out of only one logarithm. The idea and first formation of tables for this purpose are due to Gauss, but Mr. Gray was the first to perceive their utility in the calculation of life contingencies, and to him is due their introduction as well as the calculation of the necessary tables. They are throughout original calculations, and in their construction the author recalculated a

P 2

considerable portion of Matthiessen's Tables, published in 1818, and therein discovered numerous errors.

In 1865 Mr. Gray published some tables for the formation of logarithms and anti-logarithms to twelve places, with explanatory introduction; a work which has been described as "the most complete account of the simplest and best of the known methods for the calculation of isolated logarithms." A further work— *Tables for the Formation of Logarithms and Anti-logarithms to Twenty-four or any less Number of Places*—was published in 1876. The principle of the method adopted by Mr. Gray in this important contribution is the same as in his previous publication. It depends upon the resolution of the number whose logarithm is required into factors whose logarithms are tabulated; and the logarithm is obtained by summation of the logarithms of those factors taken from the table. It may be mentioned that the preface to this work contains a very full and careful history of this method with its successive developments, the final improvement, which consists in the use of three-figure factors, being due to Mr. Gray himself.

By far the greater portion of Mr. Gray's mathematical work will be found in the pages of the *Journal of the Institute of Actuaries.* His papers indicate an accurate knowledge of mathematical processes, and display a comprehensiveness and clearness of treatment which render them of standard value.

In 1874 Mr. Gray called attention to the peculiar advantages of the Arithometer of M. Thomas (de Colmar) in its application to the construction of life contingency tables, and his paper forms an extremely lucid exposition on the subject. All the applications of mathematics to numerical calculation possessed a singular attraction for him. He was an excellent calculator, and it was his delight to exemplify the refinement of modern mathematical processes by pushing calculation effected by their means to an extraordinary degree of accuracy. For example, he calculated the cube root of 2 to 56 decimal places by Horner's method, and verified its accuracy by a direct multiplication, performed by means of the Arithometer (*Messenger of Mathematics,* vol. vii. p. 51). He also calculated the values of all the surds which occur in the sines of every third degree of the quadrant to twenty-four places (*Id.* vi. p. 105). Besides his mathematical work, he devoted a considerable portion of his leisure to microscopical science, to which he was much attached.

Mr. Gray was of an exceedingly simple, genial, and affable nature. He was perhaps more a scientific man than a practical man of business. His many amiable qualities gained for him the respect and esteem of all with whom he was associated.

As years advanced his health became much enfeebled, and his old pursuits had to be given up; and he passed away on January 17 at the ripe age of eighty years. By his death the insurance profession is deprived of one of its most able members, who laboured so much and so usefully in the science of life contingencies.

Mr. Gray was for many years an Honorary Member of the Institute of Actuaries, and a Fellow of the Royal Microscopical Society.

He was elected a Fellow of this Society 1847, March 12.

RICHARD LADD was born at Wandsworth on November 5, 1848, and was educated at Dr. Semple's school at St. Margaret's, near Dover. He subsequently selected a seafaring life, and at the time of his death was navigating officer of the cable steamship *Nimia*.

Extremely fond of astronomy and meteorology, he devoted most of his leisure to their study, and with the instruments lent him by the Meteorological Society he made many useful and excellent observations. He had always looked forward to the time when he could devote all his power and energy to astronomy, but this hope was frustrated by his untimely death on May 3, 1887.

He was elected a Fellow of this Society November 9, 1883.

WILLIAM GARROW LETTSOM was born at Fulham in March, 1805. He was educated at Westminster School, and during his earlier years lived much with his grandfather, Sir William Garrow. He was originally intended for the legal profession, but his inclinations were for the diplomatic service, which he entered in 1831. He was well acquainted with Cruikshank, Thackeray, and other celebrated artistic and literary men of that time, and was a contributor to various periodicals, among others to the *Omnibus*, for which he wrote under the signature of " Dr. Bulgardo."

After serving as Attaché to the British Legations at Berlin, Munich, Washington, Turin and Madrid, he was appointed Secretary to the Legation at Mexico, where he shortly afterwards became Chargé d'Affaires. While in Mexico the British Government suspended diplomatic relations with that country for a time, owing to Mr. Lettsom's representations, and he was the object of an attempted assassination. On the satisfactory termination of the dispute he was presented with a testimonial by the English residents. In 1859 he was appointed Consul-General and Chargé d'Affaires to the Republic of Uruguay, and remained at Monte Video till 1869, when he retired from the diplomatic service.

Mr. Lettsom is perhaps best known as the joint author of Gregg and Lettsom's *Manual of the Mineralogy of Great Britain and Ireland*, which was the most complete and accurate work that had appeared relating especially to the mineralogy of the British Isles. He was much interested in spectroscopic studies, and was in correspondence with the most eminent workers in this field of research. He was the author of several papers on geological, electrical, and spectroscopic subjects ; but in all branches of natural philosophy he took great interest, and his